Back to Contents

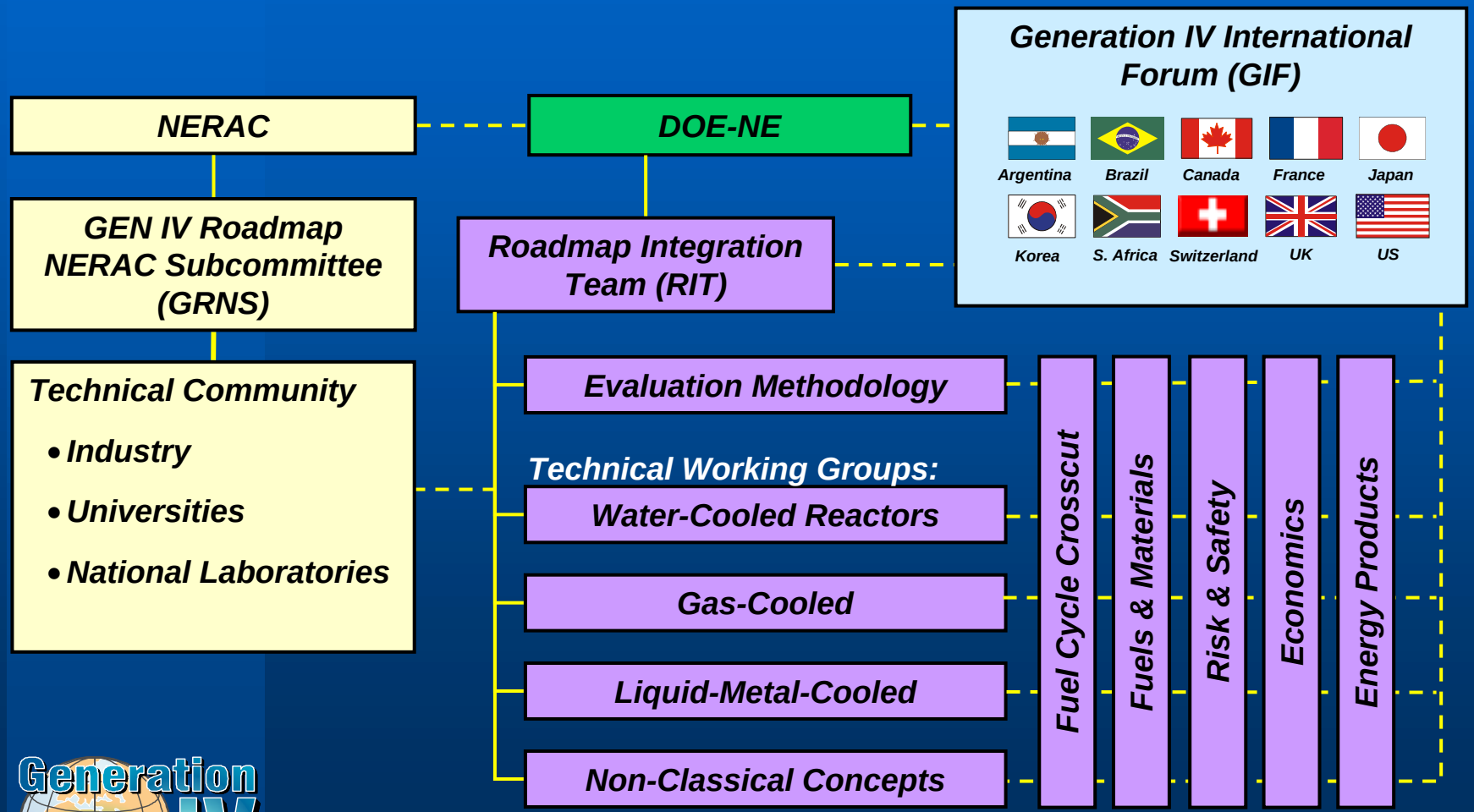
Generation IV Roadmap Update

GIF Policy and Experts Meeting: London
February 18-19, 2002

Overview of this Presentation

- *Current Roadmap Organization*
- *Roadmap Milestones and Events from October to February*
- *Current Activities and Outlook*
  - *Evaluation and Final Screening*
  - *Fuel Cycle Studies*
  - *Concept Selection Process*
  - *R&D Planning*
  - *Roadmap Report*
- *Integrated Schedule*

Overall Roadmap Organization



Currently 94 participants

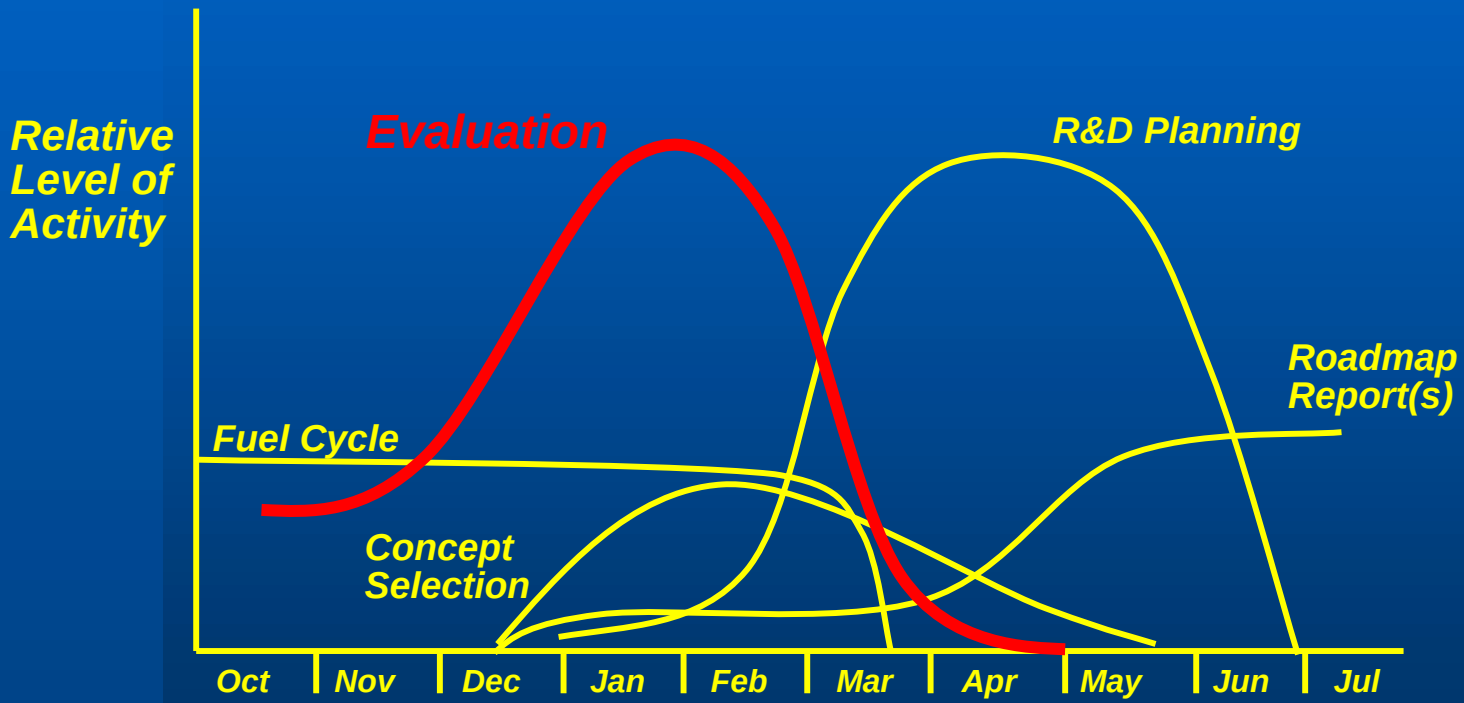
Roadmap Events from October to Present

- GIF Policy Meeting in Miami — Oct 10-11
- Two ANS Reno Sessions on Generation IV Roadmap — Nov 13
- Screening for Potential Completed — Nov 25
- Quarterly Joint Working Group meeting in San Francisco — Nov 27-29
  - –Practice evaluations to quantitative metrics
  - –First meeting of Crosscut Groups
- Final Screening Report (FSR), Rev 2 distributed — Jan 3
- Draft Roadmap Summary Report distributed — Jan 11
- Evaluations drafted to Rev 2 of FSR — Jan 25
- GRNS Meeting on Concept Evaluations — Feb 5-6
- GIF Policy & Experts Meeting in London — Feb 18-19

Roadmap Milestones in 2002

04 Mar	Fuel cycle crosscut group report
26 Apr	Concept selection complete
31 May	Interim Roadmap
28 Jun	R&D Integration Plan
02 Aug	Final Roadmap (draft)
27 Sep	Final Roadmap

Major Roadmap Activities are in Transition



Final Screening of Water and Gas Concepts

Water-cooled	
U / Once through	***(no longer used)***
U / Pu recycle (MOX)	***CANDU-NG***
	SBWR
	Integral Primary System Reactor (IPSR)
	High-Conversion ABWR
	Supercritical Water Reactor-Thermal
	Supercritical Water Reactor-Fast
Gas-cooled	
U / Once through	***Prismatic Modular Reactor (PMR)***
	Pebble Bed Reactor (PBR)
	Very-High-Temperature Reactor (VHTR)
U-Th / recycle	***Generic thermal-spectrum gas system***
U / Actinide recycle	***Gas Fast Reactor (GFR)***

Liquid Metal and Nonclassical Concepts

Liquid metal-cooled	
U / Once through	*Super-Safe, Small, Simple (4S)*
U / Actinide recycle	*Na-cooled/ oxide fuel/ adv aqueous recycle*
	Na-cooled/ metal fuel/ pyroprocessing
	Pb/Pb-Bi-cooled/ Russia
	Pb/Pb-Bi-cooled/ US
	Pb-cooled/ transportable
Non-classical	
U-Th / Once through	*Advanced high-temperature reactor (AHTR)*
U / Actinide recycle	*Molten-salt reactor (MSR)*
	Vapor-core reactor (VCR)

Generation IV

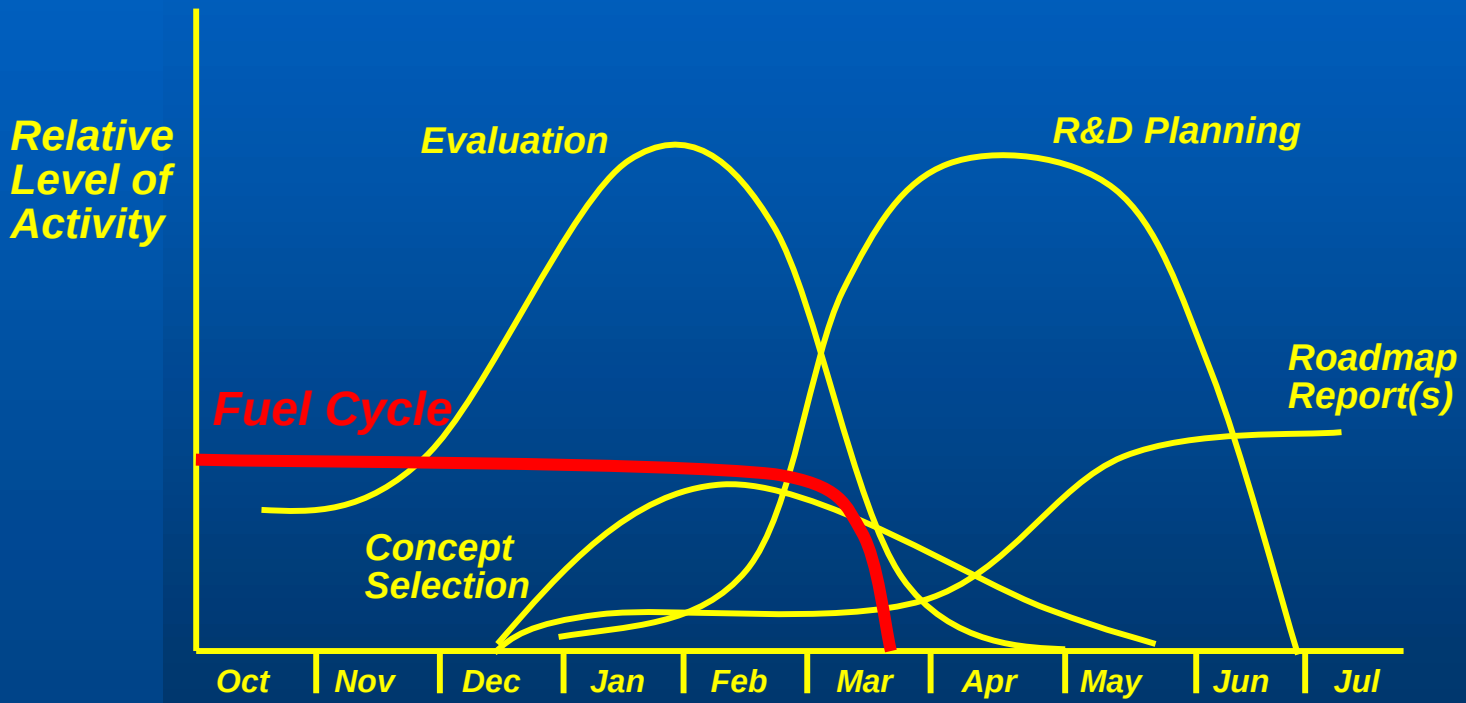
Final Screening Path Forward

• *'Demo' evaluation in San Francisco*	*All*	*Nov 27-29*
• *Discussion on selection process*	*RIT/Co-chairs*	*Jan 17*
• *Draft evaluation*	*TWGs*	*Jan 25*
• *Making evaluations consistent*	*RIT/Co-chairs*	*Feb 19-20*
• *Consistency (con't.) and draft selection*	*RIT/Co-chairs*	*Mar 5-8*
• *Final Screening completed*	*TWGs*	*Apr 26*

Issues:

1. ***System definition***
2. ***Importance of integration with fuel cycle***
3. ***Evaluation consistency***

Fuel Cycle Crosscut Activity

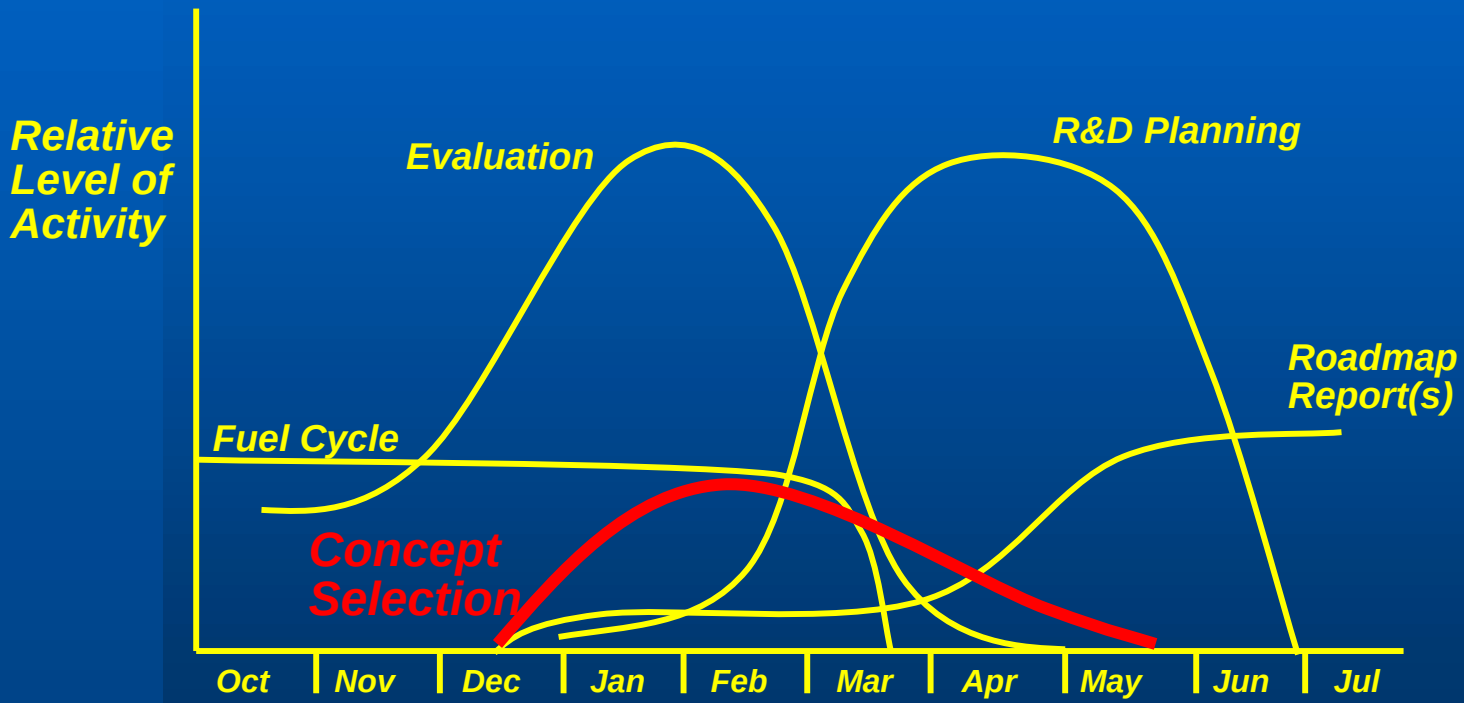


Fuel Cycle Studies

- Fuel Cycle Crosscut Group (FCCG) Started — Dec 2000
- Draft FCCG Reports
  - Fuel Cycle simulations — May 2001
  - Fuel Cycle R&D needs — Nov 2001
- Expanded FCCG Report
  - Added cycles and evaluations — Mar 2002

- The FCCG report will be reviewed at a NERAC meeting in April

Concept Selection Activity



Concept Selection Advancement

- *Selection process activities to date:*
  - *3 monthly RIT/DOE meetings (Dec/Jan/Feb)*
  - *2 GRNS meetings (Oct/Feb)*
  - *2 special RIT/TWG Co-chair meetings (Dec/Feb)*

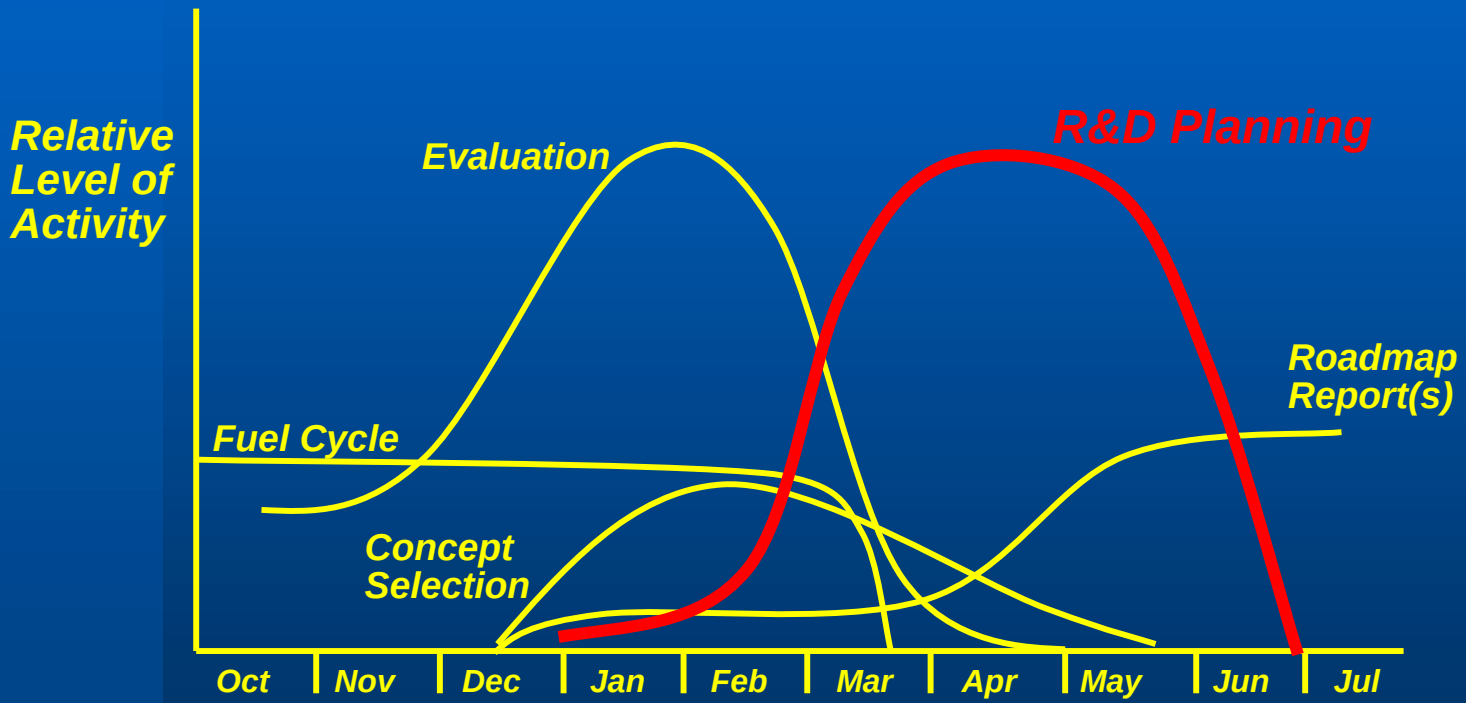
- *The proposed approach will be presented at this meeting*

- *Upcoming meetings:*

– *Preliminary selection proposal*	*RIT/Co-chairs*	*Mar 5-8, Houston*
– *Review by GRNS*	*RIT/GRNS*	*Apr 2-3, DC*
– *Review with Roadmap participants*	*Quarterly Mtg.*	*Apr 9-11, DC*
– *Review by GIF Experts**	*RIT/GIF Experts*	*Apr 12, DC*
– *Follow-up GIF Experts Meeting**	*RIT/GIF Experts*	*~May/June*
– *Review and endorsement by GIF*	*GIF*	*July 9-10, Rio*

*(*newly proposed)*

R&D Planning Activity



R&D Scope Report Outline

Executive Summary

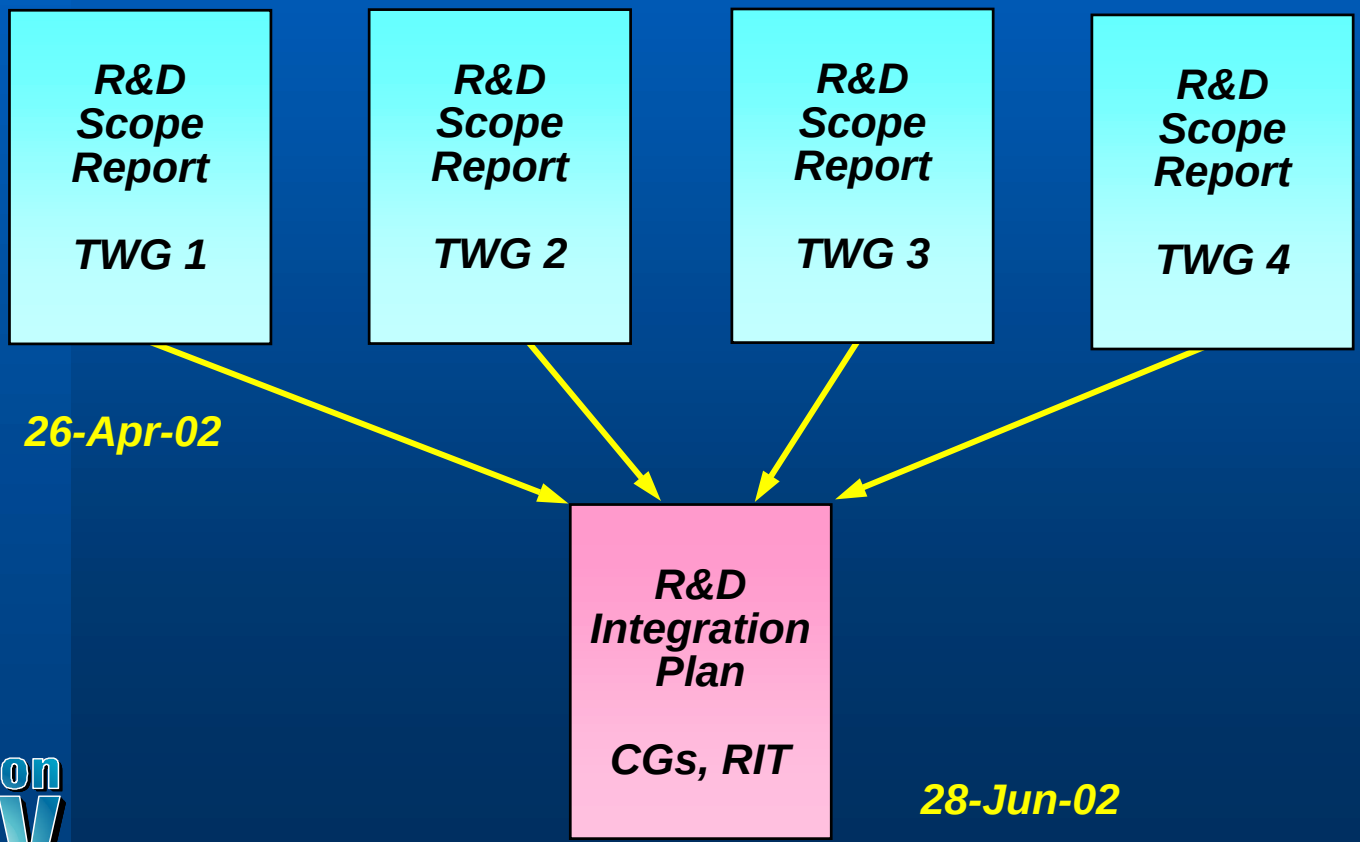
1. *Introduction*
2. *Concept Potential and Technology Gaps*
   - *Identify concepts with the greatest potential*
   - *Justify 'screening out' low-potential concepts*
   - *Discuss and characterize technology gaps*
3. *Required R&D and the R&D Challenge*
   - *R&D activities to achieve 'proof-of-performance'*
   - *Evaluate confidence/risk, cost, schedule, etc.*
   - *New facilities, facility modifications, or other infrastructure*
4. *Evaluations and Recommendations*
   - *Summarize the evaluations*
   - *Present concept potential and R&D challenge*
   - *TWG recommendations concerning concept selection*

Technical Areas of the R&D Scope Report

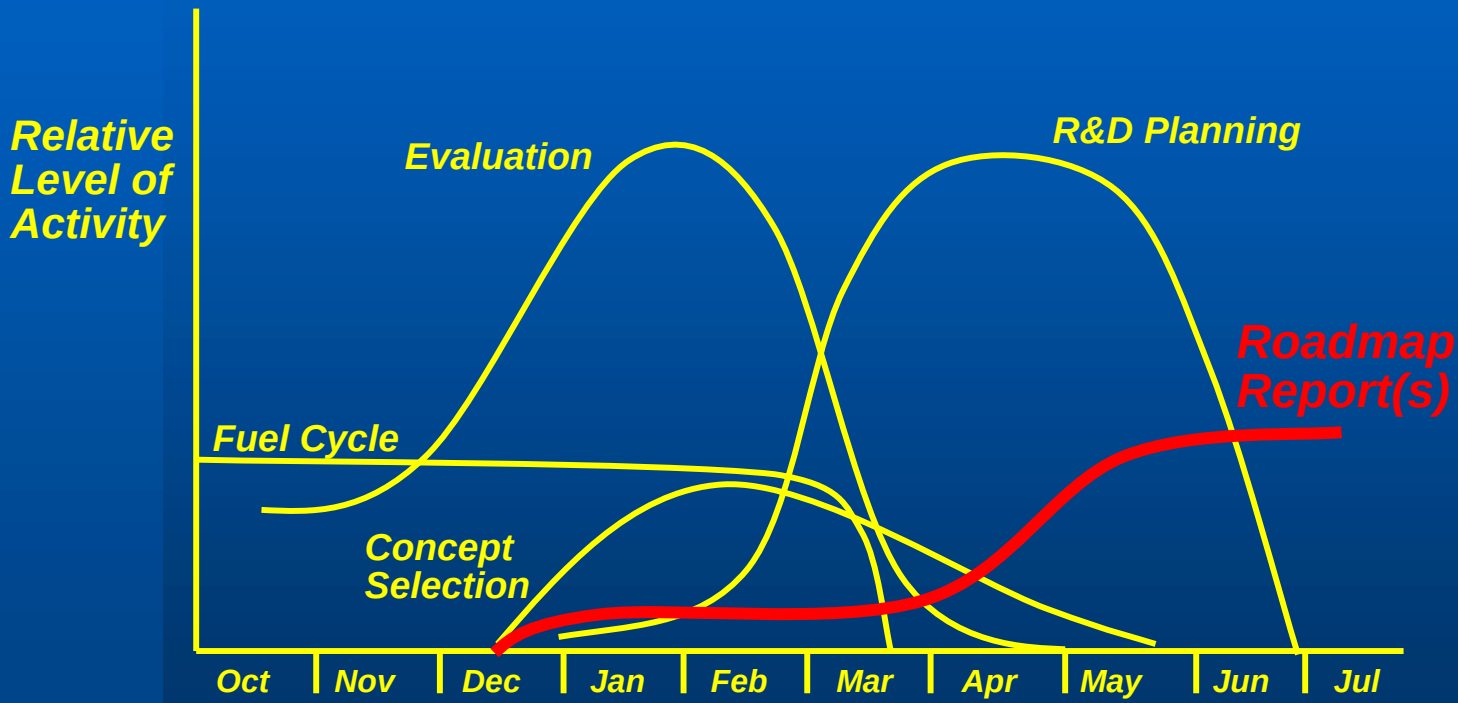
- *Fuel Cycle*
- *Risk and safety*
- *Reactor plant*
- *Core*
- *Fuel and absorbers*
- *Materials*
- *Instrumentation & Control*
- *Human Factors*
- *Waste disposal and uses*
- *Energy conversion*
- *Decontamination and decommissioning*
- *Non-electrical products*

Creating the R&D Integration Plan

For the 6-8 selected concepts:



Roadmap Report Writing



Roadmap Report Structure

The Roadmap will be a two-part document

- *Part 1: Roadmap Summary (~20 pages)*
  - *Sets the context and summarizes recommendations*
  - *Written for non-technical audience*

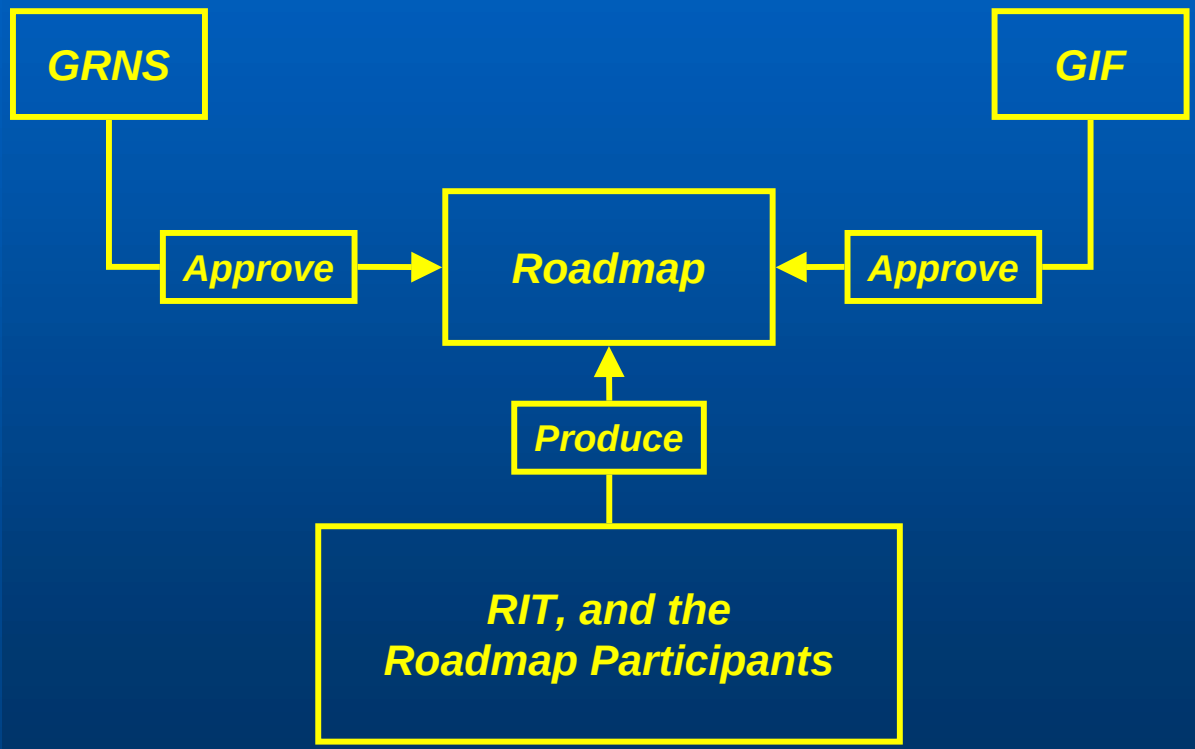
- *Part 2: Technical Roadmap (~80 pages)*
  - *Provides technical descriptions, analysis, and justifications*
  - *Written for nuclear technical audience*

Detailed reports on CD-ROM

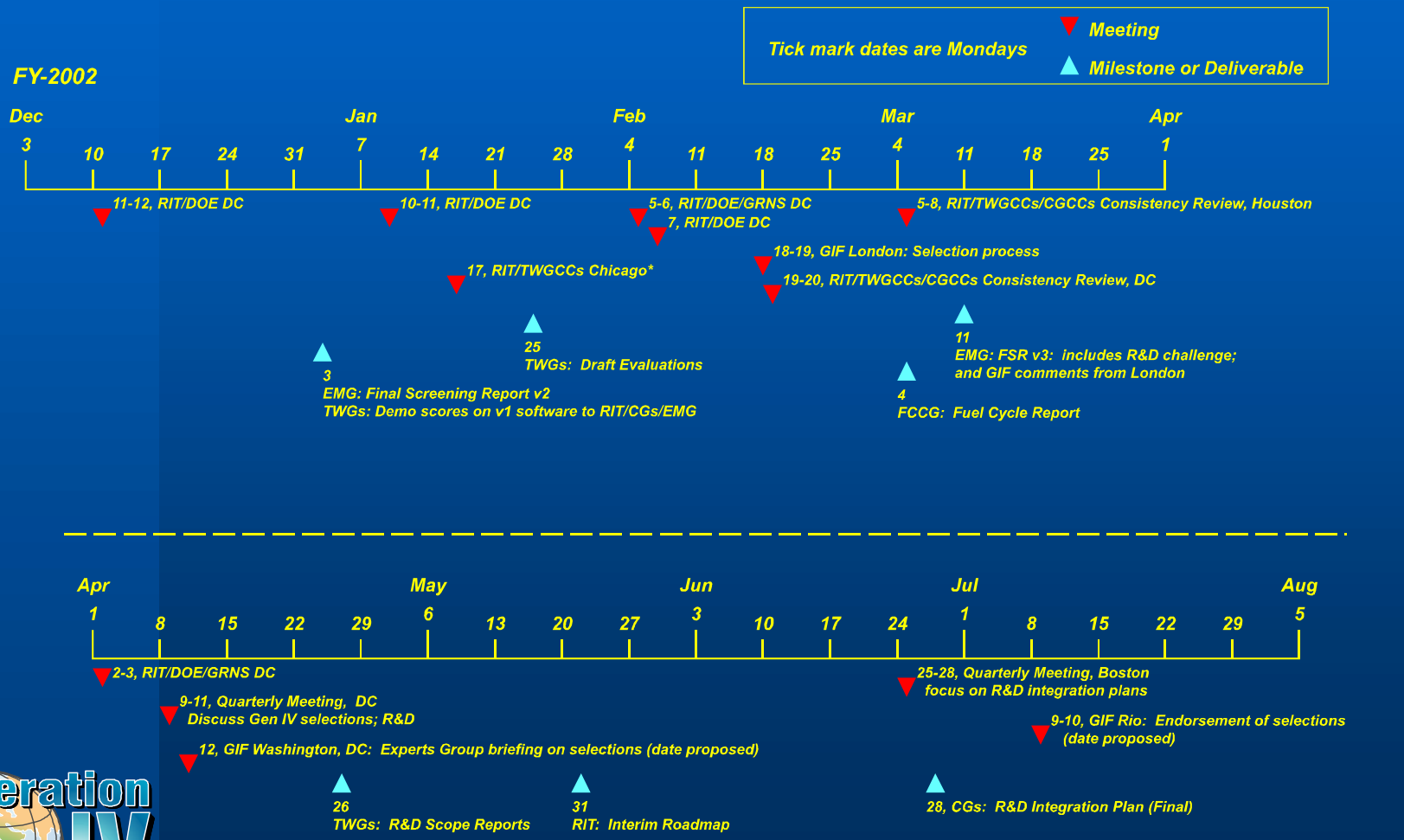
Part One: Roadmap Summary Report

1. Vision
2. The Technology Roadmap in Brief
   - Participants
   - Goals
   - The Generation IV Roadmap Project
   - Evaluation Methodology
3. Findings of the Roadmap
   - Fuel Cycles
   - Concepts Evaluated
   - Most Promising Systems
   - Recommended R&D
4. Conclusions

Completing the Roadmap



Integrated Roadmap Schedule



Conclusions

- *Roadmap involves five different thrusts*
  - *Fuel cycle studies*
  - *Concept evaluations*
  - *Concept selection*
  - *R&D Planning*
  - *Roadmap Report Writing*
- *Evaluations are being advanced for 20 concepts*
- *Concept selection is important for focusing the R&D planning and completing the roadmap*